

Remarks/Arguments

This paper is filed in response to the Office Action of April 24, 2008. In the Office Action, the Examiner rejected all claims 20-37. For the following reasons, reconsideration is respectfully requested.

Section 112, second paragraph, and Section 101 rejections:

Claims 20-37 were rejected under 35 U.S.C. § 112, 2nd paragraph, as being indefinite for lacking active, positive steps in the claimed process. Claim 20 was also rejected under 35 U.S.C. § 101 as failing to properly define a process claim for this reason.

In response, independent claim 20 has been amended as provided above. It is believed that this amendment addresses the basis for the Examiner's rejections. Claims 21-37 depend, directly or indirectly, from independent claim 20. Accordingly, it is believed that the amendment to claim 20 also overcomes the rejections of dependent claims 21-37. Claims 24 and 29 have also been amended to make them consistent with amended claim 20.

Claim 30 was also rejected for lacking sufficient antecedent basis for the limitation "the aqueous phase of a bottoms product." Claim 30 has been amended to address this rejection.

Section 103(a) rejections:

Claims 20-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Becker et al. (DE 199 11910 A1) alone or in view of DeWet et al. (WO 02/31085 A2). Applicants respectfully disagree.

As amended, claim 20 is directed to a process of extracting oxygenates from a hydrocarbon stream. The process includes the step of contacting the hydrocarbon stream with an extraction solvent comprising methanol and water in an extraction step, wherein the methanol and water are added separately to the hydrocarbon stream in the extraction step.

The cited prior art neither teaches nor suggests the separate addition of methanol and water in the extraction step. According to the Examiner, it would have been obvious to modify the process of Becker by adding methanol and water

separately into the extraction column because in both cases (either methanol and water added separately or methanol and water added together as a mixture), both methanol and water are intimately contacted with the hydrocarbon stream.

Therefore, according to the Examiner "It would be expected that the results would be the same or similar when adding methanol and water in the column separately or in the column as a mixture." Office Action, page 5.

Contrary to the assertions of the Examiner, the present inventors have surprisingly found that there is an unexpected benefit of adding the water and methanol separately. This is explained more fully at paragraph [0032] of the application (Page 9, line 24 to page 10, line 13):

The presence of water in the extraction column 20 improves the recovery of paraffins and olefins in the raffinate stream 22. Although it is important for the water to be present in the lower section of the extraction column 20, including the point where the extract 26 is drawn from the extraction column 20, it has been found that it is not necessary for the water to be present throughout the extraction column 20. It has also been found that it is beneficial to have as little water as possible at the top of the extraction column 20 as the presence of water lowers the methanol's ability to take up oxygenates which would result in a higher solvent to feed ratio when compared to dry methanol. Thus, if as little water as possible is present in the upper section of the extraction column 20 it is beneficial in that it is possible to use a lower solvent to feed ratio than when water is added as a mixture together with methanol. Adding the water separately into the extraction column 20 between the hydrocarbon stream 14 and methanol stream 21 results in an improved paraffin and olefin recovery with better raffinate 22 purity than if the water and methanol were added as a mixture. As mentioned above, the aqueous phase stream 32 recovered from the decanter 30 is recycled to the water stream 34 into the extractor column 20. The stream 32 may contain oxygenates and the addition of this water at a different point to the methanol stream 21 lower down the extraction column 20 ensures that oxygenates are cleaned from the stream in-the column, before they can appear in the raffinate stream 22.

These benefits are illustrated in the results from Examples 2 and 3 of the application. Separate addition of the water and methanol components of the solvent system results in better overall recovery of olefins and paraffins (92.3% and 91.4% respectively) compared to the recovery of 89.9% in the Comparative Example 1.

The overall better recovery of olefins and paraffin is not the only benefit of the inventive process. A second benefit of this mode of operation is a lower content of oxygenates in the hydrocarbon stream obtained by the claimed method compared to higher value obtained in Comparative Example 1. The lower amount of oxygenates in the stream of hydrocarbons from the inventive process is beneficial because it makes it possible to use the olefins for production of linear alkyl benzene.

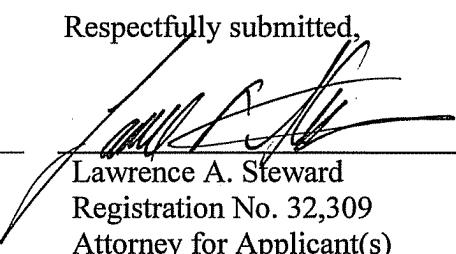
In view of the above, Applicants respectfully submit that the claims are novel and unobvious in the light of the cited prior art.

Conclusion:

Based on the foregoing, Applicants respectfully submit that the grounds for rejection have been overcome, and that all claims 20-37 are in condition for allowance. Accordingly, Applicants respectfully request the issuance of a Notice of Allowance. If the Examiner believes that prosecution of this application can be advanced by way of a telephone conversation, the Examiner is invited to telephone the undersigned attorney.

Respectfully submitted,

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